

Effect of Pictorial Information Booklet on Mothers' Care of Their Children with Leukemia**Hanan Mohamed Mohamed Tork⁽¹⁾, Fathia Ahmed Mersal⁽²⁾**

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Abstract

Background: The improvement of health literacy in general is a major concern worldwide. We assumed that mothers of children who are receiving treatment for leukaemia experience practical challenges in caring for their children. Treatment adherence and improved health outcomes for children with Leukemia require easily understandable of caregivers for health information. **Objective:** To evaluate the effect of pictorial information booklet on mothers' care of their children with Leukemia in Cairo, Egypt. **Methods:** Design of this study was A quantitative, quasi-experimental pre-posttest group design. The sample were 65 mothers who had children with leukemia in Cairo, Egypt. A pictorial information booklet was given, and in the post-test period the same structured knowledge questionnaire was used. Practice was assessed using the interview method by direct observation. **Results:** The findings revealed that 78.5% of mothers had unsatisfactory knowledge regarding leukemia pre education program while 86.2% of them had satisfactory knowledge regarding leukemia post education program with highly statistically significant differences between pre and post education program using pictorial information booklet ($p < 0.000$). Approximately 76.9% of mothers had adequate total practice regarding Leukemia post education program with highly statistically significant differences between pre and post education program using pictorial information booklet ($p < 0.000$). **Conclusion:** Based on the study findings, it can be concluded that the pictorial information booklet effectively improved mothers' knowledge and practices regarding care of their children with leukemia. **Recommendations:** It is recommended that future studies investigate mothers improvement in knowledge and practices as well as retention of knowledge over an extended period of time.

Keywords: Information Booklet, Knowledge and Practice, Mother's Care, Children with Leukemia

Introduction

Annually, there are nearly 300 000 new cases of children and teenagers, aged 1 to 19 years, diagnosed with cancer worldwide (WHO, 2019), which considered a leading cause of death (WHO, 2021a). Currently, cancer is increasing in the world and discovering the disease in childhood is a traumatic experience for those who care for them (Masa'deh, 2015). The main types of cancer in children are different from adults, the most common cancers in children include acute leukemia, brain tumors, lymphoma, bone and soft tissue sarcoma, and germ cell tumors (Lam et al. 2019). When a child is diagnosed with cancer, it is a great challenge not only for the child but also for his or her parents especially mothers.

Paying attention to mothers' experience of having a child with cancer is of great significance to helping mothers adapt to the disease and provide better care for their child

(Siyu, 2020). Chronic illness such as leukemia in children results in negative impact on the child and on his/her mother (Cornelio et al. 2016). Several studies (Siegel et al. 2021; Siegel et al. 2021) have described cancer as the third primary cause of death in children aged between 1 to 4 years, and it is also the most leading cause of death among children between 5 to 14 years. Detecting cancer in the early stages and given patients the best treatment, can contribute to improvement of children's conditions, and treatment varies depending on the stage and type of cancer (Saeed et al., 2021). Therapy of childhood acute lymphoblastic leukemia (ALL) has been successful during the last decades due to improvements in intensive combination chemotherapy and supportive care (National cancer institute, 2021)

The most successful strategy to reduce the burden of cancer during childhood and improve outcomes is to focus on early diagnosis

followed by evidence-based therapy with tailored supportive care (WHO, 2021b). With the increasing incidence of childhood cancer, the role of parents especially mothers became more and more important (Siyu, 2020). The mothers perceived their life as changing immediately upon hearing their child's cancer diagnosis as they experienced a plethora of emotions. They sought support at various points during their child's illness to cope and overcome the challenges during the cancer treatment journey (Al Omari et al., 2021).

According to Pan-American Health Organization (2014), cancer in children is more likely to respond to effective treatment and result in a greater probability of survival, less suffering, and less intensive treatment. Significant improvements can be made in the lives of children with cancer by detecting cancer early, avoiding delays in care and increase a awareness of families. The diagnosis of leukaemia has an immediate and long-lasting impact on child and his family, which represents a major challenge to the family members, as well as to the child. Families have to endure the transition from feeling in control of their lives to living with constant uncertainty. These transitions require effective preparation, which includes providing them with a thorough understanding of the disease, diagnostic procedures, treatment and its associated side effects, , the goals and expected benefits of the treatments, common morbidities from procedures and instructing them to participate in their child's care (Davis & Viera, 2014).

Mothers of children diagnosed with cancer experience a multitude of challenges, including physical, psychosocial, spiritual, communication, knowledge, and different care-related problems (Reisi-Dehkordi et al., 2014; Bemis et al., 2015). They spend a considerable amount of time with their children and can sacrifice their personal health during the treatment journey (Rafii et al., 2014). Most of the literature regarding the care of children with cancer highlighted the role of one or both parents (Ahmadi et al., 2019; Arabiat & Altamimi, 2013; Masa'deh & Jarrah, 2017; El Malla, 2017).

Tariman et al., (2016) emphasized that one essential part of the nurse's role in clinical practice has always included providing information. The nurse's role in providing information to parents about various types of cancer was supported. Nurses have an important role in disseminating health-related information. Nurses are essential in presenting disease-related information in the palliative care context, and they emphasized that they must balance clinical decision-making based on the patient's and family's choices and wants. In the population of children with cancer, the information given by nurses to parents has been thoroughly researched. The findings reported that nurses have an essential role in providing disease and treatment-related information, as well as ensuring that chemotherapy protocols are followed.

Significance of the study:

The most common childhood malignancies is Leukemia, which accounting to 33.2% of all childhood malignancies, In Egypt, those children represent approximately 73.3% of all pediatric patients with leukemia at Nasser Institute (EL-Hefnawy et al., 2013). Taha et al., (2019) recommended that the outcome of treatment could be improved by interventions that help to prevent discontinuation of therapy such as support groups and educational programs for families and nurses. In Egypt, there are scarce studies conducted to investigate the effect of family education on treatment outcomes especially in pediatric nursing. Therefore, the current study aimed to evaluate the effect of pictorial information booklet on mothers' knowledge and practice regarding care management of their children with Leukemia.

The study aim:

To evaluate the effect of pictorial information booklet on mothers' care of their children with Leukemia in Cairo, Egypt through:

- Assessing the level of mothers' knowledge regarding care management of their children with Leukemia.
- Assessing the level of mothers' practice regarding care management of their children with Leukemia.

- Designing pictorial information booklet on knowledge and practice regarding care management of their children with Leukemia.
- Evaluating the effectiveness of pictorial information booklet on knowledge and practice regarding care management of children with Leukemia among their mothers.
- Determining the correlation between knowledge and practice pre and post-pictorial information booklet teaching program.

Research Hypotheses:

H1: Pictorial Information Booklet has positive effect on Mothers' knowledge regarding care of their children with leukemia.

H2 : Pictorial Information Booklet has positive effect on Mothers' reported practices regarding care of their children with leukemia.

Operational definitions:

Pictorial Information Booklet is a small, thin book with paper covers, typically giving information supported by photographic images on a particular subject (Oxford Lexico, 2020).

Leukemia: is a cancer of the early blood-forming cells. Most often, it's a cancer of the white blood cells, but some leukemias start in other blood cell types. A number of different leukemias are classified according to the course of the disease and the predominant type of white blood cell involved. Leukemia is the most common children cancer, accounting for twenty-nine percent of all pediatric cancers (Miller & Jemal, 2019).

Subjects and Methods

Research design:

One group pre-posttest quasi-experimental research design was utilized in this study. This design is important to the nature of the study issue, having one or more group subjects observed on pre-post manipulations (Creswell, 2012).

Research Setting:

The present study was conducted at outpatient clinic of pediatric oncology at National Cancer Institute Cairo University.

Subjects:

A purposive sample of 65 mothers with their children selected according to the inclusion criteria; diagnosed with leukemia,

aged 6 to 10 years, receive chemotherapy and approved to participate in the study were recruited from the outpatient clinic.

The sample size was calculated based on the previous studies according to the following formula whereas sample size will be 62 mothers to achieve a power of 85% and a level of significance of 5% (two sided), assuming improvement 50% with standard deviation of the change in the outcome 1.4, to avoid low response and withdrawal the researchers recruited 65 mothers.

$$n = \left(\frac{Z_{1-\alpha/2} + Z_{1-\beta}}{ES} \right)^2$$

Tools of data collection:

I- Interviewing Questionnaire: a structured interview questionnaire, which developed by the researcher to collect data about characteristics of the sample it divided into three parts:

Part one includes personal characteristics questions such as age, child's gender, mothers' education, job consanguinity marriage relationship and monthly income.

Part two the symptoms that appeared on children as fatigue and weakness, repeated infections etc. **Part three** consists of 32 questions, it was developed to assess the knowledge of mothers regarding childhood leukemia which contain meaning of leukemia, diagnosis and treatments of leukemia, mothers' knowledge regarding leukemia, its managements and chemotherapy etc.

II-Mothers' self-reported practices questionnaire: it consists of 45 items as physical exercise, care provided for the child during and after chemotherapy sessions and precautions taken to protect the child at home after chemotherapy session.

Scoring system:

The knowledge score two was given for each correct answer and one for incorrect answer. For each area of knowledge, the scores of the questions were summed-up and the total score divided by the number of the items. These scores were converted into a percent

score. The total mothers' knowledge was considered adequate if the percent score was 60% or more and inadequate if less than 60%.

The reported practice score two was given for each use and one for don't use. For each item of practices, the scores of the questions were summed-up and the total score divided by the number of the items. These scores were converted into a percent score. The total mothers' practices were considered satisfactory if the percent score was 65% or more and unsatisfactory if less than 65%.

Field work:

The data collection period for this research lasted 7 months, commencing in July 2019 to February 2020 this was carried out into two phases; preparatory and implementation phases.

Preparatory phase: An official permission to conduct the proposed study was obtained from the chairperson of the Pediatric Oncology Department in NCI. Mothers who met the recruitment criteria were asked to participate in the study. The purpose and the nature of study were clarified to each mother separately. A formal written consent was attained from each mother to get her acceptance as well as to gain her collaboration. Data collection was done pre and post education using pictorial information booklet implementation. The researchers interviewed each participant in a separate room to maintain confidentiality and sometimes within a group of mothers (4-5 mothers). Researchers designed the Education materials to teach a practical approach to best mothers' practices. A pictorial Information Booklet was developed to convey this information, with pictures and graphics to accommodate visual as well as verbal learners, with educational objectives clearly written on the booklet.

Implementation phase: Data were collected and program was implemented over a period of 7 months, 2 days/week and 4 hours/day starting from July 2019 to February 2020. Mothers were given a handout of this pictorial information booklet for future reference. The education program conducted through four consecutive phases: assessment, planning, implementation and evaluation. The assessment phase was included the assessment of the setting, assessment of required materials

and assessing the required sample size. The designing phase was involved designing of education using pictorial information booklet materials which designed and guided by assessment of knowledge and practice of mothers. Second: The extensive review of the related literature. Based on the assessment phase, the program content and media (in the form of Education using Pictorial Information Booklet) were prepared. The pictorial booklet was developed on the basis of the results of the assessment phase and reviewing the relevant literature in Arabic language.

Education program objectives: aims to evaluate the effect of pictorial information booklet on mothers' care of their children with Leukemia in Cairo, Egypt. After the pilot study was conducted, implementation and evaluation phase was initiated.

The contents of the booklet:

- 1- Introduction about leukemia, 2- Definition of leukemia. 3- Types of leukemia 4- Causes of leukemia, 5- Signs and symptoms of leukemia, 6- Treatment of leukemia, 7- Role of caregiver in care management of their children with leukemia.

Teaching methods

Mothers and their children who met the inclusion criteria were recruited by the researchers; personal data, history of child's diagnosis were collected by the developed tools from each mother and her child on individual bases. Assessment of mothers' knowledge and practice (pre-test) was conducted and taken from 25 to 30 minutes. The education using pictorial information booklet designed and planned to be followed during the diagnosis period and induction phase of chemotherapy was explained through 7 educational sessions on individual basis and sometimes for a group of mothers (4-5 mothers); aided by the using of illustrated pictorial information booklet, and educational materials.

Time of each session ranged between 30 to 45 minutes, using effective media of conveying information as, laptop, posters, and power point presentation. Health education program provided at this period was aimed to improve mother's knowledge about leukemia. The first class centered on the general information of leukemia, basics of therapeutic methods and chemotherapy. The second class

focused on effects of disease on different aspects of child's life, and precautions taken to protect the child at home after chemotherapy session. The third and fourth session was dedicated to patient care in hospital and at home as physical exercise, Care provided for the child during and after chemotherapy session.

The evaluation phase was done three weeks post implementation of the educational program by comparing changes in mothers' knowledge, and practice score.

Ethical considerations:

Permission for conducting the study was obtained by submission of an official letter issued from the Faculty of Nursing, Ain Shams University to the director of National Cancer Institute, Cairo University Hospital. In addition, written informed consent from each mother was obtained after they were given a detailed explanation of the aim and methods of the study and study subjects' data are kept confidential throughout the study by saving data anonymous. All participants were also given contact mobile number to enable them to obtain further details about the study.

Pilot study:

The pilot study was carried out on 7 mothers representing 10% of the sample size in the previously mentioned settings to test the applicability of the tools, assess the clarity of the embedded tools and estimated the time required for each subject to fill out the questionnaire. Minimal modifications were done and the subjects of the pilot study were included in the study. The authenticity of the content validity was verified by a group of experts in pediatric nursing (using Delphi technique); their opinions have been extrapolated regarding the consistency, accuracy, and suitability of the tools. The internal consistency of the study tool was evaluated using Cronbach's alpha (α) coefficients (0.79). Internal consistency is considered to be acceptable when Cronbach's alpha exceeds 0.70 (Campbell & Machin 1999).

Statistical analysis:

The data collected are coded using the Statistical Package for Social Sciences (SPSS 23.0). The data were presented using descriptive statistics in the form of number and

percentage for categorical variables and Means and Standard Deviations for continuous quantitative variables. The qualitative categorical variables are compared using the chi-square (X^2) test. Moreover, Pearson correlation for quantitative variables was done and statistical significance is considered when the P-value is < 0.05 .

Results

Table (1): describes the personal and family characteristics of the children, regarding age; it shows that 67.7% of children were 8 to 10 years with mean age 8.25 ± 2.01 while 64.6% of mothers were 30<40 years with mean age 35.18 ± 6.687 . The gender analysis shows that 53.8% of them were female and 60% of them their class from 4 to 6 class. The consanguinity marriage of the participants shows that 49.2 % had consanguinity marriage and 50% were first degree kin relationship. Regarding education of mothers, 50.8% of them reported being intermediate educated, 90.8% of them were housewife and 89.2% of them their income not enough.

Table (2): Regarding symptoms that appeared on children table 2 reveals that (89.2%, 84.6% and 80%) of children suffered from fatigue and weakness, repeated infections, fever, anorexia and loss of weight. Additionally (69.2% and 64.6%) of them suffered from night sweating, joints and bone pain. While (40%, 41% and 40%) of them suffered from enlarged and painful lymph nodes, headache and vomiting and red patches under skin.

Table (3): Illustrates the mothers' knowledge of leukemia pre and post education program using pictorial information booklet, it illustrates that 64.6% of mothers had unsatisfactory knowledge regarding information of leukemia pre education program. In addition it illustrates that 89.2% of them had unsatisfactory knowledge regarding leukemia medications and chemotherapy pre education program. Meanwhile it illustrates that enhancement in the knowledge of mothers post and education program regarding information of leukemia and leukemia medications and chemotherapy (93.8% and 81.5%) respectively with highly statistically significant differences between pre and post education program ($p < 0.000$). Additionally it illustrates that 78.5% of mothers had unsatisfactory knowledge regarding leukemia pre education program and 86.2% of them had satisfactory knowledge regarding leukemia post

education program with highly statistically significant differences between pre and post education program using pictorial information booklet ($p < 0.000$).

Table (4): Reflects the mothers' reported practice of leukemia pre and post education program using pictorial information booklet, it reflects that (32.3%, 44.6% and 70.8%) of mothers had inadequate reported practice regarding physical exercise, care provided for the child during and after chemotherapy session and precautions taken to protect the child at home after chemotherapy session respectively pre education program. In addition it illustrates that 60% of them had inadequate practice regarding total reported practice regarding leukemia pre education program. Meanwhile it reflects that enhancement in the mothers' reported practice (89.2%, 92.3% and 78.5%) regarding physical exercise, care provided for the child during and

after chemotherapy session and precautions taken to protect the child at home after chemotherapy session respectively post education program with highly statistically significant differences between pre and post education program ($p < 0.000$). Additionally it illustrates that 76.9% of mothers had adequate total practice regarding Leukemia post education program with highly statistically significant differences between pre and post education program using pictorial information booklet ($p < 0.000$).

Table (5): Reveals that the correlation between knowledge and reported practice of mothers' pre and post education program using pictorial information booklet, it reveals that highly statistically significant positive correlation between knowledge and reported practice of mothers regarding leukemia pre and post education program ($p < 0.000$).

Table (1): Number and Percentage Distribution of children Regarding their Personal and Family Characteristics (n=65)

Items	No	%
Child age		
<8 years	21	32.3
8: 10 years	44	67.7
Mean and SD of children age	8.25±2.01	
Gender		
Male	30	46.2
Female	35	53.8
Educational level		
1-3 class	26	40
4-6 class	39	60.0
Consanguinity marriage	32	49.2
Kin relationship (n=32)		
First degree	16	50.0
Second degree	11	34.4
Third degree	5	15.6
Mother's age		
<30	11	16.9
30<40	42	64.6
≥40	12	18.5
Mean and SD of mother's age	35.18±6.687	
mother's educational level		
do not read and write	12	18.5
Basic Education	12	18.5
Intermediate Education	33	50.8
Higher Education	8	12.3
The Mother's job		
Housewife	59	90.8
Working	6	9.2
Monthly income		
Enough	7	10.8
Not enough	58	89.2

Table (2): Number and Percentage Distribution of Signs and Symptoms that appeared on children (n=65)

Items	No	%
Fatigue and weakness	58	89.2
Repeated infections and fever	55	84.6
Anorexia and loss of weight	52	80.0
Joints and bone pain	42	64.6
Ease of bleeding and bruising	13	20.0
Night sweating	45	69.2
Enlarged and painful lymph nodes	26	40.0
Headache and vomiting	27	41.5
Red patches under skin	26	40.0
Gum swelling and increased tendency to bleeding	5	7.7

*N.B. items not mutually exclusive

Table (3): Number and Percentage distribution of children according to their mothers' knowledge of leukemia pre and post education program using pictorial information booklet (n=65)

Parameter	pre		post		Statistical test	
	N	%	N	%	χ^2	Sig
Total Mothers' knowledge regarding Information of Leukemia						
Unsatisfactory	42	64.6	4	6.2	48.582	0.000
Satisfactory	23	35.4	61	93.8		
Total Mothers' knowledge regarding Leukemia medications and Chemotherapy						
Unsatisfactory	58	89.2	12	18.5	65.495	0.000
Satisfactory	7	10.8	53	81.5		
Total Mothers' knowledge regarding Leukemia						
Unsatisfactory	51	78.5	9	13.8	54.600	0.000
Satisfactory	14	21.5	56	86.2		

Table (4): Number and Percentage Distribution of Children According to their Mothers' reported practice of Leukemia pre and post education program using pictorial information booklet (n=65)

Parameter	pre		post		Statistical test	
	N	%	N	%	χ^2	Sig
Total Mothers' reported practice regarding physical exercise						
Inadequate	21	32.3	7	10.8	8.922	.003
Adequate	44	67.7	58	89.2		
Total Mothers' reported Care provided for the child during and after chemotherapy session						
Inadequate	29	44.6	5	7.7	22.941	0.000
Adequate	36	55.4	60	92.3		
Total Mothers' reported precautions taken to protect the child at home after chemotherapy session						
Inadequate	46	70.8	14	21.5	31.695	0.000
Adequate	19	29.2	51	78.5		
Total Mothers' reported practice regarding Leukemia						
Inadequate	39	60.0	15	23.1	18.246	0.000
Adequate	26	40.0	50	76.9		

Table (5): Correlation between knowledge and reported practice of mothers' pre and post education program using pictorial information booklet (n=65)

Items	Practice	
Pre program		
Knowledge	R	0.392**
	P-value	0.001
Post program		
Knowledge	R	0.817
	P-value	0.000

Discussion

The present study aimed to evaluate the effect of pictorial information booklet on mothers' knowledge and practice regarding care management of their children with Leukemia. The findings of the current study revealed that about two thirds of mothers their age ranged from 30 to 40 years old with the mean age of 35.18 ± 6.687 years and half of mothers had intermediate level of education. On the other side, 18.5% of the mothers were can't read and write. In addition, the vast majority of mothers were housewives. These results were matched with a previous survey that showed highest percentage of mothers their age between 30 to 35 years and about half of them had basic and secondary school education (**Taha et al., 2019**).

Concerning the characteristics of children with leukemia, the results of the present study documented that more than half of children were females and their age ranged between 6 to 10 years. These findings were contradicted with Sutan et al., who found that two thirds of the children who participated in the study were males and their age ranged from 5 months to 18 years (**Sutan et al., 2017**). An Egyptian research conducted by **Fawzy et al.**, to identify the health-related quality of life profile among 67 Egyptian children with cancer aged 8-12 years, reported that more than two thirds of children were males (**Fawzy et al., 2013**).

According to the American Cancer Society, many signs and symptoms of pediatric leukemia happen when leukemia cells crowd out normal cells. The most common symptoms include fatigue, infections, fever, easy bleeding or bruising, pale skin shortness of breath, loss of appetite, loss of weight, joint pain, abdominal distention, headaches, seizures, and vomiting (**American Cancer Society, 2017**). The results of the present study were in accordance to the above illustrated empirical evidences and demonstrated that the majority of children suffer from fatigue and weakness as well as repeated infections, fever and loss of weight. In the same context, the most of them were exposed to Joints and bone pain, Anorexia, red patches under skin and night sweating. According to the current findings, the education program using pictorial

information booklet led to significant increase in knowledge of the mothers in post-program, as compared to the pre-program education. In this regard, some researches indicated that educational programs succeeded in improving the samples' knowledge (**Mahmoud & Abd EL-Aziz, 2015; Taha et al., 2019**).

Results of the present study indicated that the majority of the participants had unsatisfactory knowledge regarding information of leukemia pre education program using pictorial information booklet. These results are in the same line with **Krisnana et al., (2021)** who studied effect of psycho-education program on knowledge of oral hygiene to the parents of children with leukemia and observed the same result among the mothers. This may be related to that mothers not received any educational program regarding information of leukemia before. In this regards, the mean score of mothers' knowledge regarding childhood leukemia was dramatically increased after getting pictorial information booklet. A highly statistically significant difference was detected between the total mean score of mothers' knowledge pre and post pictorial information booklet. The overall level of mothers' knowledge after application of the pictorial information booklet was good among more than half of the mothers, these findings support the current study hypothesis. In fact, some studies stated that increasing mothers' knowledge has important effects on the control and adaptability of the child's illness and will be effective in their achievement to better results in the long-term (**Lakshmi and Saraswathi 2012; Saeed et al., 2021**). As an example, **Ikata et al. (2017)** reported in their study that a structural training program has increased mothers' awareness and improving their performance about postoperative care in children with cleft lip and palate.

Results of the present study highlighted that after education program used the pictorial information booklet, highly statistically significant improvements were observed in mothers' reported practices regarding care of their children with leukemia ($P < 0.000$). These findings are parallel to the results conducted by **Taha et al. (2019)**, who studied the effect of nursing instructions on knowledge and practice

of mothers having children with leukemia undergoing chemotherapy and reported significant improvement of the mothers' reported practice after conducting the intervention. Similarly, **Lam et al.** conducted a qualitative study among 19 parents who had a child hospitalized for more than 48 hours on parent's experiences of participation in the care of hospitalized children in the new Lands and reported the same findings (**Lam et al. 2016**).

Concerning mothers' reported practice provided for their children with leukemia during and after chemotherapy session at pre and post pictorial information booklet, the current findings highlighted that statistically significance difference were detected regarding provide care during chemotherapy sessions for their children pre and post the pictorial information booklet. The similar results were obtained by Girgis et al., who assessed mothers' knowledge and practices regarding care of their children with acute leukemia who were undergoing chemotherapy and implement a health educational program for 53 mothers depending on their needs. The findings showed that after the program was implemented, mothers' practices regarding care of their acute leukemic children undergoing chemotherapy improved significantly (**Girgis et al., 2019**). From the researchers' point of view, this reflected the positive effect of using the pictorial information booklet programs in improving practice among the studied mothers.

Findings of the current study highlighted that a significant positive correlation was found between the score of knowledge and the score of practice with statically significant differences. This association is explained by the fact that improvement in knowledge is leads to improvement in practice level. Also, mean when the participated mothers had sufficient knowledge they can practice well and this reflected the success of pictorial information booklet and their positive effect.

Conclusion:

According to the current findings, education program using pictorial information booklete can improve mother's knowledge regarding care management of their children with leukemia. Therefore, it can be concluded that providing health education in form of

training program in care providing can improve knowledge and practice in mothers of children with leukemia. Thus, it is recommended to use pictorial information booklete as an effective method in training mothers and their sick children to improve their knowledge and reported practice

Recommendations:

The following recommendations are proposed in light of the current study findings:

- It is highly important to apply pictorial information booklet to improve mothers' knowledge and practice regarding care of their children with leukemia.
- Pictorial information Booklets containing sufficient knowledge about leukemia should be printed and kept in clinics for distributing to caregiver of children with leukemia.
- Future research will include a large-scale replication of the current study in another setting to enhance generalization.

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